

IN THE CLAIMS

This listing of claims replaces all prior versions, and listings, in this application.

1. (original) A microporous and nanoporous polymeric material based on syndiotactic polystyrene in the δ crystalline form with an apparent density of 0.001 – 0.8 g/cm³ and a percentage of crystallinity between 5 – 70%, prepared according to a process comprising:

- a) preparation of a gel based on syndiotactic homopolymer or copolymers of styrene, at a polymer concentration between 0.1 and 50 wt% in a solvent or a mixture of solvents, one of which being a suitable guest of a syndiotactic polystyrene clathrate phase, wherein the copolymers contain as comonomers CH₂=CH-R olefins, wherein R is an alkyl-aryl or a substituted-aryl radical with 6-20 carbon atoms and
- b) removal of the solvent from the gel by liquid or supercritical carbon dioxide extraction process, operating at a pressure between 50 and 350 bar and a temperature between 20 and 70°C.

2. (original) The polymeric material according to claim 1, wherein the homopolymer or copolymer concentration in the gel is in the range 0.5 – 30 wt%.

3. (currently amended) A microporous and nanoporous polymeric material based on syndiotactic polystyrene in the δ crystalline form with an apparent density of 0.001 – 0.08 g/cm³ and a percentage of crystallinity between 5 – 70%, prepared according to a process comprising:

- a) preparation of a gel based on syndiotactic homopolymer or copolymers of styrene, at a polymer concentration between 0.5 and 30 wt% in a solvent or a mixture of solvents, one of which being a suitable guest of a syndiotactic polystyrene clathrate phase, wherein the copolymers contain as comonomers CH₂=CH-R olefins, wherein R is an alkyl-aryl or a substituted-aryl radical with 6-20 carbon atoms and

- b) removal of the solvent from the gel by liquid or supercritical carbon dioxide extraction process, operating at a pressure between 50 and 350 bar and a temperature between 20 and 70°C;

The polymeric material according to claim 2, wherein the gel is a physical gel characterized by the absence of chemical cross-links between polymer chains.

Claims 4-7 (canceled)

8. (withdrawn-currently amended) A process for preparing a microporous and nanoporous polymeric material based on syndiotactic polystyrene being in the δ crystalline form with an apparent density of 0.001 – 0.08 g/cm³ and a percentage of crystallinity between 5 – 70%, said process comprising:

- a) preparation of a gel based on homopolymers or copolymers of syndiotactic polystyrene, at a polymer concentration between 0.1 and 50 wt% in a solvent or a mixture of solvents, at least one of said solvents being a suitable guest of a clathrate phase of syndiotactic polystyrene, wherein the copolymers contain as comonomeric units CH₂=CH-R olefins, where R is an alkyl-aryl or a substituted-aryl radical with 6-20 carbon atoms and
- b) removal of the solvent from the gel by liquid or supercritical carbon dioxide extraction process, operating at a pressure between 50 and 350 bar and a temperature between 20 and 70°C.

9. (withdrawn) The process according to claim 8, wherein the homopolymer or copolymer concentration in the gel is in the range 0.5 – 30 wt%.

10. (withdrawn) The process according to claim 9, wherein said gel is a physical gel characterized by the absence of chemical cross-links between polymer chains.

Claims 11-14 (canceled)

15. (withdrawn) The process according to claim 8, wherein said gel based on homopolymers or copolymers of syndiotactic polystyrene is prepared in situ through a polymerization reaction comprising styrene which acts both as monomer and solvent of the reaction.
16. (withdrawn) A process of using a microporous and nanoporous polymeric material as claimed in claim 1, said process comprising: absorbing volatile chemical compounds, alone or when present in a liquid or gaseous mixture, to sorbing elements comprising said polymeric material.
17. (withdrawn) A device and/or a sensor for detection of organic volatile compounds comprising a microporous and nanoporous polymeric material as claimed in claim 1.
18. (new) The process according to claim 10, wherein said physical gel based on homopolymers or copolymers of syndiotactic polystyrene is prepared in situ through a polymerization reaction comprising styrene which acts both as monomer and solvent of the reaction.
19. (new) A process of using a microporous and nanoporous polymeric material as claimed in claim 3, said process comprising: absorbing volatile chemical compounds, alone or when present in a liquid or gaseous mixture, to sorbing elements comprising said polymeric material.
20. (new) A device and/or a sensor for detection of organic volatile compounds comprising a microporous and nanoporous polymeric material as claimed in claim 3.